



Air Force
Research Laboratory | AFRL
Science and Technology for Tomorrow's Aerospace Force

AERONAUTICAL SCIENCES DIVISION

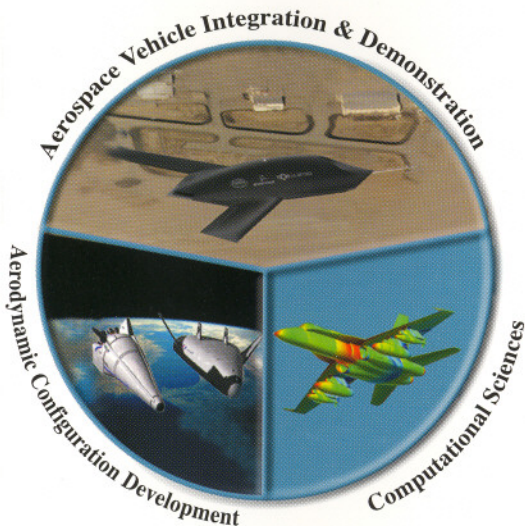


AIR VEHICLES DIRECTORATE

MISSION

Lead a partnership of government, industry and academia to:

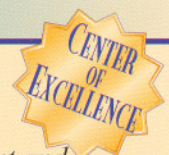
- *Develop aero science technology to greatly enhance warfighter capability in the 21st Century*
- *Accomplish basic research, exploratory and advanced technology development in aerodynamic configurations, physics-based modeling and simulation, and aerospace vehicle integration and demonstration*
- *Support the Air Vehicles Directorate's integrating concepts:*
 - *aircraft sustainment*
 - *unmanned air vehicles*
 - *space access and future strike*



Aeronautical Sciences Core Competencies

SOME OF OUR FOCUS AREAS

- *Aerodynamic Propulsion Integration*
- *Aerodynamic Flow Control*
- *Interdisciplinary Computational Aerodynamics*
- *Aerodynamic Weapons Integration*
- *Plasma Physics and Aerodynamic Interaction*
- *Aerospace Vehicle Design and Performance*



AERODYNAMIC CONFIGURATION DEVELOPMENT

Aerodynamic Configurations leads the development and application of a broad range of revolutionary affordable technologies to greatly enhance warfighter capability in aircraft, missiles and high-speed vehicles. We provide the tools and expertise to assess innovative technologies designed to lower vehicle cost and increase payload and range.



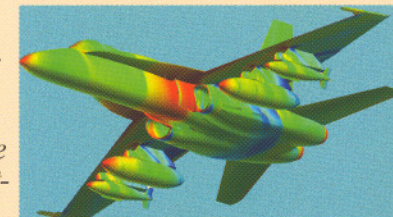
AEROSPACE VEHICLE INTEGRATION & DEMONSTRATION

Integrates and demonstrates multidisciplinary advances in airframe-propulsion, airframe-weapons, and air vehicle control for affordable, survivable mission success. DoD experts in engineering development and technology integration responsible for transitioning to the warfighter the capability to deliver new weapons from survivable platforms.



COMPUTATIONAL SCIENCES

Leads the nation in the development and application of fast, accurate and easy-to-use numerical simulation methods for aerospace vehicle design. We focus on computational aerodynamics, aeroelasticity, electromagnetics, hypersonics, and high performance parallel computing to support customer's modeling and simulation requirements. We provide accurate and affordable computational technology to support customer needs from vehicle design to warfighting superiority.

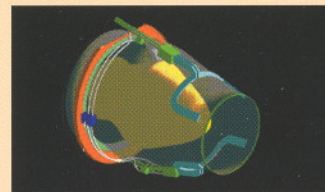


SUSTAINMENT

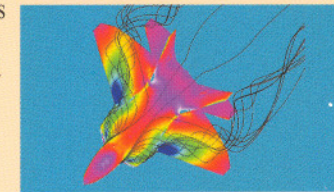
Exploit flow control technologies to reduce or eliminate buffet and fatigue on air vehicle structures extending airframe life and reducing operation and support costs.



Develop, demonstrate and transition active flow and aerodynamic control technology to entire air vehicle spectrum reducing cost and weight with improved maintainability, supportability, safety and survivability.



Investigate dynamic aerostructural interactions, such as buffeting, in unsteady flows thus reducing required maintenance and operations and support costs.



UNMANNED AIR VEHICLES

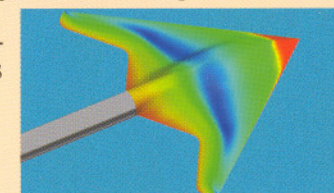
Capitalize on the absence of a cockpit to optimize the air vehicle configuration to provide superior mission capability at reduced cost. Conduct concept evaluations to assess performance as the first step in Simulation-Based Research & Development.



Develop advanced cost effective survivable inlet and nozzle components and technology for safe weapons carriage and separation. Develop and integrate flight vehicle control technology for seamless manned and unmanned air vehicle operation.

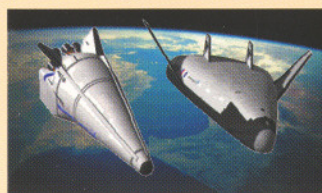


Perform aerodynamic design, evaluation and optimization of advanced unmanned air vehicles. Provide quick, accurate aerodynamic assessments from initial development through operational deployment.

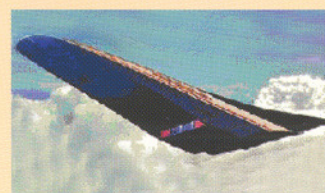


SPACE ACCESS AND FUTURE STRIKE

Push the research envelope in plasma aerodynamics and boundary layer transition to significantly reduce drag in hypersonic vehicles and realize true Global Reach power projection.



Develop engine air induction and exhaust systems and integrated airframe-propulsion designs that optimize the installed performance resulting in affordable, global range of high-speed air vehicles.



Determine performance of low-cost, reusable launch vehicle and hypersonic strike aircraft concepts. Develop computational magnetogasdynamic techniques. Partner with other AFRL Directorates, government agencies, and industry to provide affordable space access.

